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EXAMINER	
YEH, EUENG NAN	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/788,481	ACCOMAZZI ET AL.	
	Examiner	**Art Unit**	
	EUENG-NAN YEH	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _03 July 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1 and 3-32_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _28,29 and 32_ is/are allowed.

6)☒ Claim(s) _1, 3-27, 30, 31_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

FINAL ACTION

Response to Amendment

1. The following Office Action is responsive to the amendment and remarks received on July 3, 2008. Original claim 2 was canceled and claims 30, 31, and 32 are added. Claims 1, 3-29 and newly added claims 30-32 remain pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3, 6-7, 20-23, 25-27, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of George, III et al. (US 6,175,655 B1) and Udupa et al. (US 5,812,691).

Regarding claim 1, George discloses a segmentation system comprising: selecting an initial location within the structure to be segmented ("In one embodiment, the method comprises the steps of forming a morphological skeleton of the three-dimensional data set, selecting a seed data point within the morphological skeleton so as to identify a desired anatomical structure to be displayed or analyzed ..." at column

3, line 43. See also, "the structuring element is first centered upon a seed pixel by the operator. The seed pixel is one which the operator knows is a part of the anatomical structure for which reconstruction is desired ..." at column 13, line 43);

assigning to each of the data points a value of connectivity indicative of the confidence that respective ones of the data points are part of the same structure as said initial location, said value of connectivity including a function of the distance of the respective point from said initial location ("...fuzzy connectivity to define additional data points of the desired anatomical structure so as to reconstruct substantially only the desired anatomical structure ..." at column 3, line 48. See also, "Connectivity is a mathematical concept ... The algorithm described in this invention generalizes this concept of connectivity to the discrete topological grids utilized by a computer to store the digital image data by utilizing fuzzy set operators. A fuzzy set is itself a generalization of a discrete set by defining a function over a set representing degrees of membership such that membership varies from zero which indicates no membership to one which indicates complete membership" at column 6, line 24. "The use of fuzzy connectivity assures that all of the data points associated with the anatomical structure are utilized in the reconstruction process. In accordance with one embodiment of the present invention, fuzzy connectivity defines the entire data set for the desired anatomical structure by utilizing a modified Hausdorff metric ..." at column 13, line 35. Furthermore, "To define connectivity, this algorithm utilizes a fuzzy generalization of mathematically defined distances between sets as a connectivity criterion. This criterion

establishes that if two points or two sets of points are within a specified distance of one another, then they have membership to the same set of points" at column 6, line 35); monitoring variations in said predetermined parameter along a path between said points and utilizing a function employing variations in said parameter as an indicator of said value of connectivity (the variation of the membership of a structure is defined: "A fuzzy set is itself a generalization of a discrete set by defining a function over a set representing degrees of membership such that membership varies from zero which indicates no membership to one which indicates complete membership" at column 6, line 30. Furthermore, "To define connectivity, this algorithm utilizes a fuzzy generalization of mathematically defined distances between sets as a connectivity criterion ..." at column 6, line 35. As depicted in figure 15, "use of the structuring element to determine if two points are within a common set is shown. This is accomplished by placing the structuring element 202 around one of the points 210 of interest and then determining whether or not the second point of interest 212 lies within the boundary of the structuring element 202. As shown, the second point 212 does lie within the boundary of the first structuring element 202. In order to find additional points which are part of the common set of points, and define the anatomical structure of interest, this process is repeated by placing a structuring element 204 around the second point 212 in order to determine if any points lie within the boundary thereof" at column 15, line 19. See also "Each point so defined to be within the data set is assigned a fuzzy membership number between zero and one, depending upon the distance between adjacent points, as discussed above" at column 15, line 44.

George does not explicitly disclose the threshold value for the connectivity and the relationship between selecting data point and threshold value.

Udupa, in the same field of endeavor of image segmentation ("... identifying all fuzzy objects present in image data by segmenting the image ..." at column 1, line 16), teaches the threshold value for the connectivity. Furthermore, "The volume distribution of the fuzzy connected component may also be calculated by the processing means for different settings of the predetermined threshold. In other words, the volume distribution is different for different thresholds. Preferably, the strength of connectedness of spatial elements in the digital representation of the scene has any of a number of values so that the determination of the strength of connectedness along paths between spatial elements is truly dynamic ..." at column 5, line 20. Thus, the threshold defines the strength of connectedness can affect the number of data volume size represents a segmented feature and vise versa.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to include the segmentation system George made with a robust connectivity threshold and volume distribution as taught by Udupa, in order to effectively "permit extraction of a specified fuzzy object and identification of all fuzzy objects present in image data" at Udupa column 4, line 53.

Regarding claim 3, the length of said path is combined with said function employing variations of said parameter to obtain said value of connectivity (discussed in claim 1, "...fuzzy connectivity to define additional data points of the desired anatomical

structure so as to reconstruct substantially only the desired anatomical structure ..." at George column 3, line 48. See also, "Connectivity is a mathematical concept ... by defining a function over a set representing degrees of membership such that membership varies from zero which indicates no membership to one which indicates complete membership" at George column 6, line 24. Furthermore, "To define connectivity, this algorithm utilizes a fuzzy generalization of mathematically defined distances between sets as a connectivity criterion. This criterion establishes that if two points or two sets of points are within a specified distance of one another, then they have membership to the same set of points" at George column 6, line 35).

Regarding claim 6, threshold value is adjustable to vary the data points selected for display (discussed in claim 1, "The volume distribution of the fuzzy connected component may also be calculated by the processing means for different settings of the predetermined threshold. In other words, the volume distribution is different for different thresholds. Preferably, the strength of connectedness of spatial elements in the digital representation of the scene has any of a number of values so that the determination of the strength of connectedness along paths between spatial elements is truly dynamic ..." at Udupa column 5, line 20. Thus, the threshold defines the strength of connectedness can affect the number of data volume size represents a segmented feature and vise versa).

Regarding claim 7, wherein said function employing variations in said parameter is an indication of the maximum variation in said parameter (discussed in Udupa column 8, lines 15 to 60. See also equation 6 at Udupa column 8, line 56).

Regarding claims 20 and 21 (as depicted in Udupa figure 6, numeral 230 the initial location for the segmentation process is selected from pixels with particular feature to be segmented such as white matter ("WM"), gray matter ("GM"), and ventricles ("CT") etc.).

Regarding claim 22, said initial location is selected from examination of a set of data points to identify a characteristic indicative of a particular feature (discussed in claim 21, initial location is selected from examination of a set of data points to identify a characteristic indicative of a particular feature).

Regarding claim 30, a computer readable medium comprising computer executable instructions that when executed causes a computing device to perform the claim 1 method (as depicted in George figures 1, 2A, 2B, and 2C).

Regarding claim 23, an imaging apparatus comprising:
a data store having a set of spatially related data points representing variations in a predetermined parameter (as depicted in Udupa figure 5, numeral 130 data are stored in a memory 130. “image data representing T2 and proton density (PD) values are

obtained from MR scanner 100 in accordance with a predetermined protocol" at column 21, line 65);

a comparator to compare a value of said predetermined parameter at each of said data points with that of an initial location within said structure to be segmented to establish a value of connectivity indicative of the confidence that respective ones of said data points are part of the same structure (as depicted in Udupa figure 5, numeral 170 the processor is the comparator which assigns each data point a distance related connectivity indicative of the confidence as discussed in claim 1, "... determining the strength of connectedness or "hanging togetherness" of each spatial element in the digital representation of the scene with other spatial elements in the digital representation of the scene. Those spatial elements having strengths of connectedness with other spatial elements above a predetermined threshold are then clustered into a fuzzy connected component of a fuzzy object in the scene ..." at Udupa column 5, line 9);

said value of connectivity including a function of the distance of the respective point from said initial location ("...fuzzy connectivity to define additional data points of the desired anatomical structure so as to reconstruct substantially only the desired anatomical structure ..." at George column 3, line 48. See also, "Connectivity is a mathematical concept ... The algorithm described in this invention generalizes this concept of connectivity to the discrete topological grids utilized by a computer to store the digital image data by utilizing fuzzy set operators. A fuzzy set is itself a generalization of a discrete set by defining a function over a set representing degrees of

membership such that membership varies from zero which indicates no membership to one which indicates complete membership" at George column 6, line 24. "The use of fuzzy connectivity assures that all of the data points associated with the anatomical structure are utilized in the reconstruction process. In accordance with one embodiment of the present invention, fuzzy connectivity defines the entire data set for the desired anatomical structure by utilizing a modified Hausdorff metric ..." at George column 13, line 35. Furthermore, "To define connectivity, this algorithm utilizes a fuzzy generalization of mathematically defined distances between sets as a connectivity criterion. This criterion establishes that if two points or two sets of points are within a specified distance of one another, then they have membership to the same set of points" at George column 6, line 35);

monitoring variations in said predetermined parameter along a path between said points and utilizing a function employing variations in said parameter as an indicator of said value of connectivity ("To define connectivity, this algorithm utilizes a fuzzy generalization of mathematically defined distances between sets as a connectivity criterion ..." at George column 6, line 35. As depicted in George figure 15, "use of the structuring element to determine if two points are within a common set is shown. This is accomplished by placing the structuring element 202 around one of the points 210 of interest and then determining whether or not the second point of interest 212 lies within the boundary of the structuring element 202. As shown, the second point 212 does lie within the boundary of the first structuring element 202. In order to find additional points which are part of the common set of points, and define the anatomical structure of

interest, this process is repeated by placing a structuring element 204 around the second point 212 in order to determine if any points lie within the boundary thereof" at George column 15, line 19. See also "Each point so defined to be within the data set is assigned a fuzzy membership number between zero and one, depending upon the distance between adjacent points, as discussed above" at George column 15, line 44; a selector to select respective points that meet an established threshold (as depicted in Udupa figure 6, numeral 300 compute volume which will select data that meet an established threshold as discussed in claim 1, "The volume distribution of the fuzzy connected component may also be calculated by the processing means for different settings of the predetermined threshold ..." at Udupa column 5, line 20. And "volume is output as a function V(x) of the strength of the object" at Udupa column 24, line 24).

Regarding claim 25, a method of selecting an initial location for segmenting an image comprising the steps:

examining a data set pertaining to said structure to identify one or more characteristics of said structure ("utilizing fuzzy connectivity to define additional data points of the desired anatomical structure so as to reconstruct substantially only the desired anatomical structure. Reconstruction of substantially only the desired anatomical structure facilitates the review and analysis of the anatomical structure ..." at George column 3, line 48. "by utilizing fuzzy connectivity, the set of all data points defining a particular anatomical structure of interest are defined such that surface details of the anatomical structure, such as surface smoothness thereof, are maintained during the

reconstruction process and are thus included in the reconstructive anatomical structure" at George column 15, line 48. Thus, surface smoothness is one characteristics of said structure. See also, "clustering spatial elements having strengths of connectedness with other spatial elements above predetermined thresholds into fuzzy connected white matter, gray matter, ventricle, and lesion components of the portion of the patient's brain in the image slice" at Udupa column 6, line 29. Thus, white matter, gray matter, ventricle, and values above predetermined thresholds are other characteristics of said structure);

selecting said initial location according an identification of said one or more characteristics ("In one embodiment, the method comprises the steps of forming a morphological skeleton of the three-dimensional data set, selecting a seed data point within the morphological skeleton so as to identify a desired anatomical structure to be displayed or analyzed ..." at George column 3, line 43. See also, "specifying spatial elements in at least one of the gray matter, white matter, and ventricles of the MR image slice through the patient's brain as starting points for a strength of connectedness determination for the spatial elements" at Udupa column 6, line 19).

Regarding claim 26, wherein said data set is said set of spatially related data points (discussed in claim 25, said data set is said set of data points of morphological skeleton of the three-dimensional spatially related data set or spatial elements of the MR image slice).

Regarding claim 27, said data set is obtained from a set of data points other than those being segmented (as depicted in Udupa figure 6, numeral 230 the initial location for the segmentation process is selected from pixels with particular feature to be segmented such as white matter ("WM"), gray matter ("GM"), and ventricles ("CT") etc. Thus, said data set is obtained from a set of data points other than those being segmented).

Regarding claim 31, a computer readable medium comprising computer executable instructions that when executed causes a computing device to perform the claim 25 method (as depicted in George figures 1, 2A, 2B, and 2C).

4. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of George and Udupa as applied to claims discussed above, and further in view of Zhang et al. (US 2003/0144598 A1).

Regarding claim 4, the George and Udupa combination discloses a segmenting system with distance related connectivity function. The George and Udupa combination does not explicitly teach weighting factor to vary the effect of distance on the connectivity.

Zhang, in the field of endeavor of "automatic nodule detection" in paragraph 22, line 2, teaches a weighting factor can be used to apply to distance to affect the confidence level as depicted in figure 9: "... A distance confidence function 916, based on the distance between the nearest vessel and the airway candidate, is scaled by

weighting factor beta at multiplier 918 ... A decision block 924 receives the overall confidence level and determines whether it is greater than or equal to a threshold value T_{conf} ... If the overall confidence is not less than T_{conf}, function block 926 determines that the candidate is located on an airway. If the overall confidence is less than T_{conf}, function block 928 determines that the candidate is not located on an airway" in paragraph 44, line 8. Without departing from the essence of Zhang's methodology, a weighting factor can be used to vary the effect of distance on the value of connectivity.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the segmenting system of the George and Udupa combination, to include the distance weighting factor as taught by Zhang, to enhance the confidence level thus "improve the overall diagnostic accuracy" in paragraph 52, line 5.

Regarding claim 5, weighting factor is variable (discussed in claim 4, as depicted in Zhang figure 9, numeral 918 variable beta is the weighting factor).

5. Claims 8-9 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of George and Udupa as applied to claim1 discussed above, and further in view of Dellepiane et al. (IEEE, Vol. 5, No. 3 March 1996, pp. 429-446).

Regarding claim 8, the George and Udupa combination discloses a segmenting system with distance related function for each data point to determine the connectivity. The George and Udupa combination does not explicitly teach the multivalue characteristics of segmentation results.

Dellepiane, in the same field of endeavor of image segmentation ("multivalue characteristics of segmentation" at page 429, right column, line 30), teaches a multivalue labeling with each pixel a value ranging from zero to one. "On the basis of this result, a segmented image can be interpreted as a topological map from which one can derive a set of object areas or contours. The highest membership values correspond to points that are most likely to belong to a searched object" at page 431, left column, bottom paragraph. The plurality of paths is depicted in figure 1.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the segmenting system of the George and Udupa combination, to include multivalue characteristics of segmentation as taught by Dellepiane, which proved by the results obtained on real images to be "good quality of results and the robustness and the speed of the method" at page 429, right column, line 43.

Regarding claim 9, plurality of paths is limited by application of a volume size value (discussed in claim 1, the threshold and the number of data volume size are mutually related which limits the plurality of paths).

Regarding claim 24, a path selector to select a plurality of paths between said initial location and each of said respective points, said comparator selecting a maximum value of connectivity (as depicted in Udupa figure 5, numeral 170 processor is the path selector will select a plurality of paths as discussed in claim 8. See also Dellepiane equation (3.3) for the maximum connectedness).

6. Claims 10-19 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of George and Udupa as applied to claims discussed above, and further in view of Turek et al. (US 6,754,376 B1).

Regarding claim 10, the George and Udupa combination discloses a segmenting system with distance related connectivity function. The George and Udupa combination does not explicitly teach value mapping.

Turek, in the same field of endeavor of image segmentation ("segmenting three-dimensional (3D) structures from a series of cardiac images" at column 1, line 7, teaches an automatic segmentation method "The vessel segmentation process automatically evaluates the image data in accordance with predetermined classification values to extract desired portions of the data to keep for the vessel visualization and to discard portions not desired. These classification values include pixel intensity or CT number of the pixels, pixel location relative to the seed point, the size of similar pixel groupings, and pixel connectivity in both two and three dimensions" at column 2, line 49. As depicted in figure 2 "... At 201, the input volume data is evaluated against a threshold in a known manner to produce a binary mask of pixels that are in the value range of interest, and those that are outside that range ... In this embodiment, the classification value or threshold is a measure of pixel intensity often referred to as CT number and measured in Hounsfield units ... as a result of thresholding at 201, pixels are turned "on" if they are part of a certain range of CT numbers and are turned "off" if they are not a part of the range of CT numbers. The binary mask resulting from applying

a threshold to the input CT values is the input to the two parts of the segmentation process ..." at column 3, line 38. Thus, data are evaluated on the basis of threshold which as a mapped table value referred to as CT number in Hounsfield units.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the segmentation system of the George and Udupa combination, to include the value mapping as taught by Turek, such that the created mask can be used by the "automatic segmentation method" at column 3, line 10.

Regarding claim 11, values of said predetermined parameter are compared to a predefined range of values and those outside said range modified (discussed in claim 10, pixels are turned "off" if they are not a part of the range of CT numbers).

Regarding claim 12, said values are modified by reducing said values to zero (discussed in claim 11, "off" means value zero).

Regarding claim 13, an area of said image is selected and values of said predetermined parameter in said area are modified (discussed in claim 10, the methodology applies to volume data too).

Regarding claim 14, values are modified by reducing said values to zero (discussed in claim 10, "off" means value zero).

Regarding claim 15, values of said predetermined characteristic are exceeding said threshold are changed to a common value (discussed in claim 10, pixels are turned "on"/"off" based on the threshold range of CT numbers).

Regarding claim 16, values of said predetermined parameter are compared to say initial location and those within predefined limits of that of said initial location are selected for further processing (discussed in claim 10. See also "All the "on" pixels that are connected to the seed point specified by the user are kept ..." at Turek column 3, line 66).

Regarding claim 17, the number of the selected data points is compared to an anticipated value (discussed in claim 10, "The vessel segmentation process automatically evaluates the image data in accordance with predetermined classification values to extract desired portions of the data to keep for the vessel visualization and to discard portions not desired. These classification values include pixel intensity or CT number of the pixels ... " at Turek column 2, line 49. Thus, in order to extract desired portions of data, the segmentation process will evaluate number of selected image data points with predetermined classification values such as anticipated CT number of pixels).

Regarding claim 18, said threshold is adjusted to bring said number of selected data points into conformity with said anticipated value (discussed in claim 1, "The

volume distribution of the fuzzy connected component may also be calculated by the processing means for different settings of the predetermined threshold. In other words, the volume distribution is different for different thresholds. Preferably, the strength of connectedness of spatial elements in the digital representation of the scene has any of a number of values so that the determination of the strength of connectedness along paths between spatial elements is truly dynamic ..." at Udupa column 5, line 20. Thus, the threshold defines the strength of connectedness can affect the number of data volume size represents a segmented feature and vise versa. Therefore, the threshold can be adjusted to bring said number of selected data points into conformity with said anticipated value).

Regarding claim 19, wherein said set of selected data points represents a volume of a structure (discussed in claim 10 for three dimensional image segmentation).

Response to Arguments

a. Summary of Applicant's Remark:

The previous specification and claim objections should be withdrawn in view of the amendment.

Examiner's Response:

Examiner agrees, and the previous objections are withdrawn.

b. Summary of Applicant's Remark:

"George III only mentions looking at distance between the points, which would not have the same effect as what is recited in claim 1 since a point that is very close to the seed point and even very close to the structure may still be outside of the structure according to the structure's path within the image or data set, e.g. an artery. The Applicants believe that the Examiner has overlooked the incorporation of a path as previously recited in claim 2" at response page 9, line 24.

Examiner's Response:

"...fuzzy connectivity to define additional data points of the desired anatomical structure so as to reconstruct substantially only the desired anatomical structure ..." at George column 3, line 48. See also, "The use of fuzzy connectivity assures that all of the data points associated with the anatomical structure are utilized in the reconstruction process ..." at George column 13, line 35. Thus, proper data points are utilized to reconstruct the anatomical structure. Refer to the rejections above.

c. Summary of Applicant's Remark:

"The passage in George III identified by the Examiner on page 8 of the office action merely states the desired result, i.e. selection of a seed point to identify a structure. There is no discussion of how the seed point is selected, let alone by looking at characteristics of the structure, it is believed that claim 25 as amended clarifies this distinction" at response page 10, line 18.

Examiner's Response:

"by utilizing fuzzy connectivity, the set of all data points defining a particular anatomical structure of interest are defined such that surface details of the anatomical structure, such as surface smoothness thereof, are maintained during the reconstruction process ..." at George column 15, line 48. Other characteristics, such as white matter, gray matter etc., are also discussed in the rejections above.

d. Summary of Applicant's Remark:

"Zhang teaches using a weighting factor, Zhang does not monitor variations in a predetermined parameter along a path between the data point to generate a value of connectivity" at response page 10, line 30.

"Dellepiane teaches using a topological map from which one can derive a set of object areas or contours, Dellepiane does not monitor variations in a predetermined parameter along a path between the data point to generate a value of connectivity" at response page 11, line 7.

"Turek teaches using various classification factors in segmenting an image, Turek does not monitor variations in a predetermined parameter along a path between the data point to generate a value of connectivity" at response page 11, line 18.

Examiner's Response:

"A fuzzy set is itself a generalization of a discrete set by defining a function over a set representing degrees of membership such that membership varies from zero which indicates no membership to one which indicates complete membership" at George column 6, line 30. Refer to the rejections above.

Allowable Subject Matter

7. Claims 28, 29, and 32 are allowed.

8. The following is an examiner's statement of reasons for allowance:

The present application comprises the following features in combination with other recited limitations, which the closest prior art of record taken either singly or in combination does not teach or suggest:

- Determining a second number of data points meeting said threshold; comparing said first and second number of data points; and adjusting said threshold if said first and second numbers do not correlate (independent claim 28).

Conclusion

9. Applicant's amendment is rejected in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eueng-nan Yeh whose telephone number is 571-270-1586. The examiner can normally be reached on Monday-Friday 8AM-4:30PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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